

NOTES ON AUSTRALIAN DIPTERA WITH DESCRIPTIONS.

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Family MUSCARIDAE.

In this paper I give some notes on species which have usually been placed in the family Anthomyiidae. After a very careful investigation of a great mass of material from all parts of the world I have been forced to conclude that there is no line of demarcation between these so-called families, and consider that stressing a point or two merely to conserve the existing alignment in our catalogues is not the proper method of procedure to adopt. Stein in his most recent papers included the Muscidae as part of the family Anthomyiidae, but the former, being the oldest name for the complex, must be used in preference to the latter. All the genera which I deal with in this paper belong to the group which has the first posterior cell of the wing not or but little narrowed at apex, the fourth vein being but slightly or not at all curved forward apically and never angularly bent some distance from its apex.

Most of the species were submitted to me by Dr. Eustace W. Ferguson, to whom the types will be returned, but some are from a lot sent to Dr. Aldrich of the United States National Museum by Dr. J. Ilingworth, and are placed in the institution which received them.

Subfamily PHAONIINAE.

MUSCINA STABULANS Fallen.

A very widely distributed species, occurring in Europe and America. I have before me two males from Blackheath, and Blue Mountains, N.S.W.

The flies often occur indoor and around houses. I have reared the species from decaying mushrooms in North America.

ANACLYSTA Stein.

This genus was erected by Stein in 1919. The name had been previously used by Brauer and von Bergenstamm, but their genus was based upon an undescribed species and their description was erroneous, so that he rightly refused to credit it to them. Stein himself included *flavescens* Stein, a species which does not belong to *Anaclysta* but to *Eulimnophora*. I now designate as genotype of *Anaclysta*, the species *multipunctata* Stein. The principal characters of *Anaclysta* are enumerated below.

Differs from *Limnophora* in the same manner as does *Eulimnophora* Malloch, the base of the third vein being bare and the prosternum lacking the lateral setulose hairs, while the basal abdominal sternite is partly hairy. From *Eulimnophora* it differs in the very striking forward curvature of the fourth vein at its apex, the curvature beginning at the middle of its apical section, and the presence of a very distinct bristle on the ventral surface of mid tibia beyond its middle.

I have before me two species, neither of which agrees with any of those described by Stein, all of which were from Africa, nor with *flexa* Wiedemann, described from Tranquebar.

ANACLYSTA RUFICORNIS, n.sp.

♂, ♀.—Head and thorax black, opaque, densely yellowish-gray pruinose; antennae and palpi rufous yellow; thorax with three very faint pale brown linear vittae, the median one most distinct, the ground colour yellowish-brown. Abdomen rufous yellow, sometimes coloured as thorax, tergites 2 and 3 each with a small fuscous spot on each side which are widely separated and about midway between base and apex, and a narrow elongate spot of similar colour on each side of median line on anterior margin, the narrow space between the latter whitish, more pronouncedly so in the male; fourth tergite with or almost without a pair of faint median spots. Legs black in male, the apices of femora and bases of tibiae rufous yellow, in female the mid and hind femora and tibiae are entirely rufous yellow. Wings clear. Calyptrae and halteres yellowish.

♂.—Eyes bare, very narrowly separated, interfrontalia not obliterated; antennae short; arista subnude. Thorax with 2 + 4 dorsocentrals, only the two posterior pairs long; three or four pairs of short acrostichals and some weak hairs in front of suture; sternopleurals weak, the lower posterior one sometimes absent. Abdomen ovate. Fore tibia unarmed at middle; mid tibia with one posterior bristle; hind femur with two or three bristles on basal half of posteroventral surface and a complete but sparse series of bristles on anteroventral surface which are shorter basally; hind tibia with one anterodorsal and one or two anteroventral bristles. Outer crossvein curved, at about its own length from apex of fifth; first posterior cell about one-third as wide at apex as at middle, where it is widest.

♀.—Frons about one-third as wide as head, narrowed posteriorly, each orbit at base of antennae one-third the width of frons, narrowed above, triangle slender, extending to anterior margin of frons, the space between it and the orbits linear. In other respects as ♂.

Length, 5 mm.

Type, male, allotype, and two female paratypes, Eidsvold, Queensland, January 21; reared from cowdung. Paratypes, two females, Townsville, Queensland; two females, Gordonvale, Queensland; one female, Benares, India, reared from cowdung, March, 1907 (Major Smith).

The type of *flexa* Wiedemann has the legs yellow in the female.

ANACLYSTA OBLITERATA, n.sp.

♂.—Differs from the preceding species in having the antennae and palpi black, the dorsum of thorax more brownish and with three broad brown vittae, the median one very short, not extending in front of suture nor to posterior margin; disc of scutellum dark brown, margins paler; abdomen yellowish-brown, with marks similar to the other but the submedian spots are small, punctiform, contiguous, and close to anterior margin of tergites; legs black, tibiae reddish basally.

Frons narrower than in preceding species, interfrontalia obliterated in centre. Thorax with three pairs of short presutural acrostichals; sternopleurals rather strong. Tibial armature as in last species but the hind femur has no basal posteroventral bristles, and those on anteroventral surface are confined to apical third. First posterior cell of wing fully half as wide at apex as at its widest part. Otherwise as *ruficornis*.

♀.—Similar to the male. Abdomen black, densely yellow-gray pruinose, the spots black and prominent, the submedian pair separated.

Length, 5 mm.

Type, Belaringar, March 20, 1915. Allotype, Eccleston, Allyn River, Feb. 26, 1921.

METOPOMYIA Malloch.

This genus is similar to *Helina* R.-D., differing only in having the pteropleura with some hairs in centre. The under side of the scutellum is finely haired, prealar bristle present, first posterior cell widened apically, and arista short haired.

METOPOMYIA ATROPUNCTIPES Malloch.

The only known species of the genus.

Fulvous yellow, palpi, antennae, apices of all femora and tibiae, bases of mid and hind tibiae, and all of tarsi black. Thorax slightly rufous vittate, and with a fuscous vitta from humeral angle to base of wings. Wings yellowish.

Thorax with four pairs of postsutural dorsocentral bristles; sternopleurals 1:2. Fore tibia unarmed at middle; mid tibia with two posterior median bristles; hind femur with a few sparse short black bristles on apical half of anteroventral surface; hind tibia with an anteroventral and two anterodorsal bristles, the posterodorsal setulae distinct on apical third or more. Outer cross-vein curved, at its own length from inner.

Length, 7-8 mm.

Loc.—Barrington Tops, December, 1921 (G. Goldfinch); Blue Mts., January, 1922; Fish River, March 25, 1923 (Health Dept.).

Originally described from Victoria.

HELINA FUSCOFLAVA Malloch.

This species superficially resembles *Metopomyia atropunctipes* Malloch, but is a true *Helina*, with bare pteropleura and other characters similar to species of that genus.

The antennae are yellow at bases, palpi yellow, only mid and hind femora at apices and the tarsi black; pleura with or without a fuscous streak above, and thorax and abdomen more noticeably pruinose and marked. Chaetotaxy as in *atropunctipes*, but the hind tibia has one anteroventral and one anterodorsal bristle.

Length, 5.5-7 mm.

Loc.—Two males, both with a small label "Austr.", one having an additional label with "Sydney and Moreton Bay. E. Darnell." Two males and one female, Sydney.

HELINA SIMULATA, n.sp.

♂.—Similar to *addita* Walker in colour, being black, with dense gray pruinoscence, the thorax distinctly quadrivittate, and the abdomen spotted; the legs are black, with rufous tibiae, and the cross-veins of the wings are distinctly infuscated. The abdominal markings are however less pronounced and there are additional checkerings not present in *addita*.

Eyes short haired; longest hairs on arista about as long as width of third antennal segment; thorax with three pairs of postsutural dorsocentral bristles; prealar small; sternopleurals 2:2; hypopleura bare; one or two pairs of long presutural acrostichals present. Fore tibia without median posterior bristle; hind femur with five or six long bristles on apical half of anteroventral surface; hind tibia with two anterodorsal, four or five anteroventral, and about seven short posterior bristles.

Length, 6.5 mm.

Type, Ourimbah, N.S.W. (Health Dept.).

This species runs down to Caption 10 first section in my key to Australian species of *Helina* recently published (Ann. Mag. Nat. Hist., x., 1922, p. 135), but differs from *victoria* Malloch in having the hairs of the arista longer, and the thorax with one or two pairs of presutural acrostichals.

RHYNCOMYDAEA Malloch.

This genus differs from any allied one in having a vertical carina in middle of the face which separates the antennae.

There are two Australian species.

RHYNCOMYDAEA AUSTRALIS Malloch.

A yellow species with frons in female, all tarsi, and sometimes part of the abdomen fuscous.

I have before me a female from Sydney.

RHYNCOMYDAEA CARINATA (Stein).

When I described the genus I was not certain that this species belonged to it, but I have now seen a series of specimens from Sydney and one or two other localities in New South Wales which prove that it belongs here.

It differs from *australis* in being black, with a bluish tinge, and in having the legs black, with the apices of femora and all of tibiae rufous.

Nothing is known of the larval habits of the species.

LISPOCEPHALA AUSTRALIS, n.sp.

♀.—Black, densely yellowish-gray pruinescent. Interfrontalia opaque black, triangle almost golden; antennae brownish-yellow, second segment gray above; arista dark brown; palpi yellow. Thorax with a narrow median brown vitta, and a faint brown mark behind suture laterad of the dorsocentral bristles; scutellum with the sides brown; pleura unspotted. Abdomen tawny, disc of tergites grayish, each with 3 large fuscous spots, a dark mark on each tergite below lateral curve. Legs tawny, coxae gray at bases. Wings hyaline, veins yellow. Calyptres and halteres pale yellow.

Frontal triangle extending to anterior margin of frons; each orbit with 4 bristles, the upper two directed backward; arista long plumose, longest hairs above at least as long as third antennal segment; parafacials and cheeks linear. Thorax as in the genotype, the scutellum longer, and the apical bristles curved. Legs as in genotype, mid tibia without an anterior bristle; basal posterodorsal bristle on hind tibia much longer than apical one, both anterodorsal bristles strong, one anteroventral bristle present. Inner crossvein just beyond middle of discal cell; penultimate section of fourth vein fully two-thirds as long as ultimate section.

Length, 4 mm.

Type, Burnett River, Queensland (T. L. Bancroft).

This species differs from any species of the genus known to me in having the arista very long plumose. The hairs on arista in all other species are not as long as width of third antennal segment while in this species the longest are at least three times that length.

Subfamily FANNIINAE.

This subfamily is distinguished from the others by the very short sixth wing-vein, round the apex of which the seventh forms a more or less distinct curve, though the vein itself is not distinctly evident. In the females there is one orbital bristle near the middle, which projects outward over the eye, and the upper one may also project outward; there are never more than three pairs of postsutural dorsocentral thoracic bristles; the hind coxae frequently have some setulose hairs on their upper posterior margin; and in the males the mid tibia is usually noticeably thickened from base to apex with, in some species, a rather abrupt demarcation between the basal third and apical two-thirds, while the ventral surface of the same tibia has dense pile or pubescence which is very noticeable in certain species. The abdomen in the males is usually flattened, while that of the female is normal.

All species known to me feed in the larval stages in fungi, manure, or decaying vegetable or animal matter. The common, cosmopolitan, indoor species *canicularis* Linné, is found in preserved meats at times, and some others have been found in the larval stages in the nests of bees and wasps. They are essentially scavengers and may at times cause intestinal myiasis because of their larval habits.

FANNIA CANICULARIS Linné.

This species, which is about 4.5 mm. in length, has in the male usually the two basal abdominal tergites yellowish on the sides so that, when seen on windows, these segments appear semipellucid. The yellow colour is frequently absent in female but there are on the thorax three rather noticeable dark vittae which serve to distinguish the species from most of its allies. The hind coxa in both sexes has two setulose hairs at apex behind, and the hind tibia has the preapical postero-dorsal bristle present.

I have seen several specimens from Sydney sent to me by Dr. Ferguson and also have seen it from New Zealand.

FANNIA AUSTRALIS, n.sp.

♂.—Black, slightly shining; frons and face whitish pruinose, the frontal orbits palest. Thorax grayish pruinose, with four rather distinct black vittae. Abdomen bluish gray pruinose, with a narrow median black vitta and the anterior margins of tergites narrowly blackish, more broadly so in middle. Legs black. Wings grayish, veins black. Calyptres white. Knobs of halteres black.

Frons about one-eighth of head width, orbits linear, setulose on their entire length, interfrontalia wider than either orbit throughout its length; arista subnude; cheeks very narrow. Thorax not very hairy; presutural acrostichal hairs in three series. Abdomen normal; hypopygium not prominent. Fore tibia unarmed at middle; mid femur not noticeably attenuated apically, the anteroventral series of bristles short and not very stout basally, becoming shorter and closer apically, the posteroventral series longer and finer; pubescence of ventral surface of mid tibia microscopic, only one anterodorsal bristle present; mid tarsus longer than its tibia, unarmed at base; hind femur with one rather long and one or two

shorter preapical anteroventral bristles, posteroventral surface bare; hind coxa with about three short hairs above at apex. First posterior cell of wing narrowed at apex; penultimate section of fourth vein not longer than the outer crossvein and not over one-third as long as ultimate section. Lower calyptra much protruded beyond upper.

♀.—Frons normal, entirely opaque, sometimes reddish above antennae. Posterior margins of abdominal tergites not blackened, the tip of abdomen rather pointed. In other respects much as male.

Length, 3-3.5 mm.

Type, male, allotype, and three female paratypes, Sydney, N.S.W.. October 29, 1922; one female, November 6, 1921; two females without data also from Sydney; one male and two females November, 1922; and one male and one female January, 1923, Sydney.

The black halteres, large lower calyptra, very simple armature of the legs, and the presence of setulae on hind coxae will serve to distinguish this species from any of the same size.

Subfamily LISPINAE.

The members of this subfamily are distinguished from others by the presence of a group of hairs on middle of the pteropleura, the widely separated eyes in both sexes, dilated palpi, protruded lower calyptra, shortened sixth wing-vein, and usually some weak hairs, or at times rather pronounced bristles on the parafacials.

There are three genera found in Australia which may be separated as below.

Generic synopsis.

1. Cheek with one or two outstanding bristles near lower anterior angle of eye. *Chaetolisma* Malloch.
Cheek with only fine hairs, not bristled. 2.
2. Thorax with one pair of dorsocentral bristles, situated in front of scutellum; fore femur with a few bristles on posteroventral surface apically, not with a complete series on that surface. *Xenolisma* Malloch.
Thorax with at least two distinct pairs of prescutellar dorsocentral bristles; fore femur with usually a complete series of posteroventral bristles. *Lispa* Meigen.

CHAETOLISMA Malloch.

There is but one species of this genus known to me as recorded from Australia, *geniseta* Stein. It was originally recorded from Java and Australia and since then from Ceylon, India and China. So far I have seen no Australian specimens.

There are two other species with a strong genal bristle, *miochaeta* Speiser, and *dichaeta* Stein, both from Africa. They may belong to *Chaetolisma*.

LISPA Meigen.

This genus is distributed over the whole of the world except in the extreme cold regions. The larvae are aquatic or semiaquatic, while the flies are found generally alongside of bodies of water, usually flying actively on the muddy margins.

Key to Australian species.

1. Males. 2.
Females. 6.
2. Hind metatarsus fully twice as wide as second segment, and but little longer

than it, densely black haired below; frons, face, antennae, and palpi densely white pruinulent, the palpi yellowish-white; legs black.

cana Walker.

Hind metatarsus not noticeably wider than second segment and about twice as long as it; head parts not coloured as above; legs usually partly tawny, black in *armipes* 3.

3. Fore femora with two or more series of very short and rather stout spines on the ventral surfaces besides the usual long posteroventral bristles; palpi and legs black. *armipes* Becker.

Fore femur with only the long posteroventral bristles, no short spines below. 4

4. Palpi slightly and gradually dilated apically; thorax with 5 blackish vittae, the central one generally extending distinctly over scutellum; mid and hind femora each with some widely separated long bristles on anteroventral surfaces; first posterior cell of wing not appreciably narrowed apically.

pumila Wiedemann.

Palpi with spatulate apices; thorax less distinctly vittate, the central vitta not continued over scutellum; first posterior cell of wing distinctly narrowed apically. 5.

5. Hind femur with some long setulose hairs at base on anteroventral and posteroventral surfaces, no strong bristles beyond middle on anteroventral surface. *weschei* Malloch.

Hind femur without long setulose hairs as above, but with one strong bristle beyond middle and another near apex on anteroventral surface.

xenochaeta, n.sp.

6. Thorax with one presutural and two postsutural pairs of dorsocentral bristles, all very long. *uniseta* Malloch.

Thorax with two pairs of rather short presutural and usually two very short and two long pairs of postsutural dorsocentral bristles. 6a.

- 6a. Fore femur with two or three series of very short stout spines on ventral surfaces in addition to the long posteroventral bristles. *armipes* Becker.

Fore femora without such short spines, with only the long posteroventral bristles. 7.

7. Legs entirely black, hind metatarsus thickened, but not so much so as in male; antennae short, gray pruinulent, not over half the length of face; palpi dilated; first posterior cell of wing not narrowed apically.

cana Walker.

Tibiae largely or entirely tawny yellow; hind metatarsus not dilated; antennae nearly as long as face, not gray pruinulent. 8.

8. Median thoracic vitta usually distinctly visible over disc of scutellum; first posterior cell of wing not narrowed apically. *pumila* Wiedemann.

Median thoracic vitta not carried over scutellum; first posterior cell of wing narrowed apically. 9.

9. Hind femur without strong anteroventral bristles beyond middle. *weschei* Malloch.

Hind femur with two strong bristles beyond middle. *xenochaeta*, n.sp.

LISPA CANA Walker.

A remarkably distinct species, easily recognisable by the white, almost silvery coating of the frons, face, antennae and palpi of the male. The thorax and legs are pale gray pruinulent, the former vittate anteriorly, and the abdomen rather darker. Wings hyaline, veins fuscous, whitish basally. Calyptres white. Halteres brown.

Antennae about half as long as face; arista not longer than antenna, short haired; upper half of parafacials bare, lower half with very sparse hairs; palpi much dilated at apices. Thorax with 2 + 3 dorsocentral bristles; sternopleurals

1:2. Hypopygial claspers rather elongate, glossy along outer margins, tapered into a blunt chitinated process, with a shorter tooth on outer side near apex. Fore tibia with a fine median posterior bristle; mid femur much attenuated apically; mid tibia with a posterior median bristle; hind femur slender apically, with two median anteroventral bristles, and some setulose hairs on basal half of posteroventral surface; hind tibia without a pronounced median bristle, the anterodorsal hairs setulose; basal segment of hind tarsus a little longer than second and much dilated, with dense black hairs below. Veins 3 and 4 subparallel apically.

♀.—Differs from the male in having the head yellowish pruinose, palpi yellow, hind tibia with an anterodorsal bristle, and basal segment of hind tarsus not pronouncedly swollen.

Loc.—Sydney and Woolgoolga, N.S.W.

LISPA PUMILA Wiedemann.

Easily recognisable by the coloration of the thorax which has 5 fuscous vittae, the central one extending to apex of scutellum. The legs are black, with the bases of fore tibiae broadly yellow and all of mid and hind tibiae yellow. The palpi are but little dilated in either sex and sometimes slightly darkened. Dorsocentral bristles 2+4, the anterior two pairs behind the suture very short. Mid and hind femora of male with sparse long anteroventral and posteroventral bristles, usually paired; hind tibia of male with one anteroventral and one anterodorsal bristle, of female with an additional one on the posterodorsal surface.

Length, 4.5-5 mm.

Stein described this species under the name *ignobilis* from Brisbane and Singapore. I have seen it from Queensland and Ceylon. I believe that *vittata* Stein is the same.

It bears a strong resemblance to the African species *leucospila* Wiedemann, but in the latter, the submedian thoracic vittae are very slender and usually broken, while in *pumila* they are nearly as wide as the central one and entire. The palpi in the African species are much more dilated at apices.

LISPA XENOCHAETA, n.sp.

♀.—Belongs to the same group as *glabra* Wied., *assimilis* Wied., *modesta* Stein, and *weschei* Mall. In common with these it has the thorax with 2+4 dorsocentrals, the anterior two postsutural pairs very short, and the fourth wing-vein distinctly bent forward on its apical section causing a slight but distinct narrowing of the first posterior cell. As in the others the palpi are yellowish and dilated, but the antennae are entirely black, without the rufous apex to second segment so pronounced in *weschei*. The region laterad of and above the vibrissa, unlike that of *weschei*, is almost bare, and the dorsum of thorax is very faintly vittate and entirely opaque yellowish-gray. The abdomen is similar to that of *weschei*, having large blackish paired spots which connect in centre. Legs black, gray pruinose, extreme apices of femora and all of tibiae tawny; fore tibia with a median posterior bristle; mid tibia with one posterior and one ventral bristle beyond middle; hind femur with or without a short anteroventral bristle near middle and with one anteroventral and one posteroventral bristle at apex, both short; hind tibia with one anterodorsal, one anteroventral and one posterodorsal bristle. Otherwise as *weschei*.

Length, 7 mm.

Type, Pt. Elliot, South Australia, January, 1922 (G. H. Dutton).

The outstanding character of the species is the ventral bristle on mid tibia.

LISPA WESCHEI Malloch.

For characters of this species see key and notes in description of last species.

Originally described from Port Melbourne. I have seen specimens from New South Wales, and Mt. Eba, South Australia.

LISPA ARMIPES Becker.

A black, densely gray pruinose species, with almost entirely black legs, the thorax not vittate, abdomen with two pairs of black transverse subtriangular spots which are distinctly separated centrally, and the palpi fuscous, paler basally. The outstanding character of the species is the presence of dense short spines on the ventral surfaces of the fore femur in addition to the usual long posteroventral bristles. The first posterior cell of wings is not narrowed apically and there is no ventral bristle on mid tibia.

Length, 7-8 mm.

Occurs generally over Asia; I have specimens from Ceylon which do not differ in any respect from one female from Gerringong, N.S.W., and a male from Woolgoolga, N.S.W.

LISPA UNISETA Malloch.

This species is readily distinguished from its allies by the possession of only three pairs of dorsocentrals on thorax, all of which are strong. Only the female is known and I have not attempted to place the male in the key. I have placed the male of *xenochaeta*, however, from characters of the female, but here care must be taken in identifying the species as I may have erred, the sexes of this genus being very often radically different in the armature of the legs and in other respects.

Originally described from Port Melbourne, Victoria.

XENOLISPA Malloch.

The species of this genus are more slender in habitus than those in *Lispa* and are not met with except in Africa and the Orient so far as I have seen.

Key to Australian species.

1. Wing with a preapical fuscous fascia beyond which the tip is white; fore coxae in both sexes yellow; hind femur of male without long bristles near base on ventral surface. *albimaculata* Stein.
Wing hyaline or yellowish, without preapical fuscous fascia or white tip. 2.
2. Tibiae and apical half of femora of mid and hind legs yellow; fore legs almost entirely black, the tarsi and tibiae of latter compressed; basal segment of hind tarsus of male curved and with rather dense black hairs which are longer than its diameter; basal segment of mid tarsus in same sex very slender and elongate, with outstanding setulose hairs below, which become denser and longer apically; tarsi of female normal, the fore pair much dilated or compressed. *nigrimana*, n.sp.
All tibiae and femora black, at most the former narrowly yellowish at bases. 3.
3. Abdomen with a white spot on each side of tergites 2 to 4; trochanters black; hind femora of male with 6 or 7 long closely-placed black bristles which slope obliquely towards base of femur and are flexed at middle; thorax in both sexes distinctly vittate. *sydneyensis* Schiner.
Abdomen with a white spot on each side of third tergite, and in female a yellowish spot on each side of fourth; trochanters yellowish; hind femur of male with three long, fine, rather widely spaced bristles on basal third which curve towards apex of femur at their apices; thorax in neither sex with distinct vittae. *albimacula*, n.sp.

XENOLISPA ALBIMACULATA Stein.

This species is readily distinguished from its allies by the markings of the wings which are present in both sexes, the yellow fore coxae, and the lack of any outstanding bristling of tibiae in either sex. The third abdominal sternite in the male is produced in the form of a stout process in middle of hind margin, the process being furnished with microscopic black setulae at its tip.

I have seen a male and female from Tarro, Hunter River, N.S.W., October 18, 1922.

XENOLISPA SYDNEYENSIS Schiner.

In the male sex this species is readily distinguished by the peculiar bristling of the hind femur as described in the key. The very distinctly vittate thoracic dorsum should readily separate the species in both sexes from *albimacula* which it most closely resembles.

Evidently the commonest species of the genus in Australia as I have seen it from Fish River and Sydney, N.S.W., and also from Burpengary, Queensland.

When I erected this genus I had but the female of the above species and did not recognise that it was the one described by Schiner, so inadvertently gave it a new name. This name, *atrifrontata* Malloch, becomes a synonym of *sydneyensis* Schiner.

XENOLISPA ALBIMACULA, n.sp.

♂. ♀.—Shining black. Frons black, parafacials white pruinose, yellowish below, face brownish-yellow pruinose, cheeks and lower half of occiput whitish pruinose; antennae black; palpi yellow, whitish apically. Thoracic dorsum not noticeably vittate; pleura pale gray pruinose. Abdomen of both sexes with a large white spot on each side of third visible tergite anteriorly, of female with a less distinct central elongate mark in middle of hind margins of tergites 2 and 3 and a large faint grayish spot on each side of fourth visible tergite. Legs black, coxae gray pruinose, fore and mid trochanters yellowish. Wings slightly brownish. Calyptrae whitish. Halteres obscure yellowish.

♂.—Arista plumose basally; parafacial finely haired below, almost linear; palpi slender, with short moderately dilated apices. Thorax with one strong pair of prescutellar dorsocentrals; posterior upper sternopleural strong, the others minute; basal pair of scutellar bristles shorter than apical pair. Abdomen sub-cylindrical; third visible tergite longest on sides, fourth longest in centre; fifth sternite elongate, slightly asymmetrical, rounded apically; basal part of hypopygium (6th visible tergite) with a fringe of fine setulose hairs on its disc which are directed downward. Fore legs rather stout; mid femur swollen on basal half, slender on apical half; mid tibia very slender, with one posterior bristle; mid tarsus slender, basal segment with a few fine curved bristles at apex below; hind femur with three long fine downwardly directed bristles on basal half of anteroventral surface which are bent towards apices of femora at their tips, the rest of the femur with a fringe of short fine erect hairs; hind tibia stout and, like the two basal segments of hind tarsus, with some long setulose hairs ventrally. First posterior cell of wing hardly narrowed apically.

♀.—Differs from the male in having the hind femur without conspicuous bristles or hairs; the mid tarsus normal, and the hind tibia with a better developed anterodorsal bristle near middle.

Length, 4.5 mm.

Type, male, allotype, 1 ♂ and 1 ♀ paratype, Babinda, North Queensland (Illingworth).

The male has the fore tarsus but little broadened, unlike that of *sydneyensis* in which the apical two segments are rather conspicuously wider than the others.

XENOLISPA NIGRIMANA, n.sp.

♂. ♀.—Black, with a slight olive tinge. Frons brownish-black, opaque except on triangle; face yellow pollinose; occiput gray pruinose; antennae black, apex of second segment reddish; palpi yellow. Dorsum of thorax almost glossy, with faint pruinescence, most distinct on two narrow vittae anteriorly in female; lateral margins of mesonotum and the pleura pale gray pruinose. Abdomen shining, with a pair of yellowish pruinose spots on posterior margin of first visible tergite, a central elongate spot of same colour in centre of next three tergites, a large posteriorly rounded white spot on each side of third tergite which does not extend to posterior margin, and the fifth tergite white; in the female the markings are similar but not so distinct. Legs black, trochanters, apical half of mid and hind femora and all of mid and hind tibiae tawny yellow. Wings clear. Calyptrae white. Halteres yellow.

Frontal triangle narrow, extending to anterior margin of frons; ocellar and postvertical bristles weak; arista plumose; third antennal segment narrow, not extending to mouth; parafacial sparsely hairy; palpi moderately dilated. Thorax with one pair of prescutellar dorsocentrals; basal scutellars weaker than apical pair; upper posterior sternopleural strong, the others very weak. Abdomen narrow, fifth sternite entire in male. Fore tibia and tarsus compressed in both sexes, more so in female, tibia with a fringe of very short, closely placed, slightly flattened, black hairs dorsally and ventrally; mid and hind femora thick at bases and much thinner at apices, without abnormal armature in female, but in the male the hind femur has a fringe of short setulose hairs along the anteroventral and posteroventral surfaces, and about 4 long fine bristles on basal half of ventral surface; the mid and hind tibiae of female are normal, the hind one having a short median posterodorsal bristle, but the hind tibia in male is slightly curved, and has a series of long setulose hairs on basal half of posteroventral surface, and a similar series of shorter hairs on anteroventral surface, the apical one much the longest; hind metatarsus in male slightly hollowed out and with long black hairs on anterior side. First posterior cell of wing narrowed apically; inner crossvein slightly beyond middle of discal cell.

Length, 5-6 mm.

Type, male, allotype, and 1 ♀ paratype, reared from pupae found in mud at edge of Burnett River, January 4, 1920. Paratypes, 1 ♀, Eidsvold, December, 1922; 1 ♀, Fish River, N.S.W., March 25, 1923.

The deep black dilated fore tibiae and tarsi readily distinguish this species.

Family DROSOPHILIDAE.

The members of this family so far found in Australia are all small, none exceeding 4 millimeters in length and though some of them are cosmopolitan in distribution there are several now before me that appear to be undescribed.

The larvae of several species occur in decaying or injured fruits and in fermenting matter, and may cause myiasis unless care is taken to prevent them ovipositing on articles intended for food. Uncooked soft fruits which have been exposed for any length of time should be carefully examined to prevent larvae from being ingested when such foods are eaten uncooked.

In a subsequent paper I hope to be able to present a key to the families of

the Acalyptrata occurring in Australia but in this paper I include a key to the genera I have seen pertaining to the family Drosophilidae from Australia.

The types of all new species will be returned to Dr. E. W. Ferguson from whom I received the material.

Key to genera.

1. A distinct crossvein separating the discal and second basal cells of the wing; face without a well developed central vertical carina; costa to apex of fourth vein, without minute thorns at intervals on its penultimate section below; only one humeral bristle present. *Amiota* Loew.
- No well developed crossvein between discal and second basal cells. 2.
2. Costal vein discontinued at apex of third vein or almost imperceptibly present beyond this point; the section between apices of second and third veins with a few microscopic thorns on its under side. *Leucophenga* Mik.
- Costa continued distinctly to apex of fourth vein, without microscopic thorns below apically. 3.
3. Thoracic dorsum with at least six series of microscopic setulae in front of the space between the posterior dorsocentral bristles. *Drosophila* Fallen.
- Thoracic dorsum with two or four such series. *Scaptomyza* Hardy.

N.B.—There are 25 valid known genera of the family.

AMIOTA Loew.

This genus is generally given the name *Phortica* Schiner by authors, but the generic name *Amiota* has some months priority and must be used. Sturtevant made it a synonym of *Stegana* Meigen in his paper on North American Drosophilidae, but I have since pointed out that this is an error. The two genera are quite distinct and *Stegana* is more closely related to *Leucophenga* than it is to *Amiota*.

Nothing is known of the larval habits of the species of the genus. The adults are attracted to persons by perspiration and when they are common cause annoyance by getting into the eyes and ears.

There is but one species before me from Australia and, having failed to associate it with any already described, I consider it as a new species.

AMIOTA ANNULATA, n.sp.

♂.—Head ochreous, occiput with a large blackish mark on each side, gray pruinulent along eyes; ocellar region and a spot on each side of vertex fuscous; frons whitish pruinulent when seen from certain angles. Thorax darker than head, the disc of mesonotum and pleura largely fuscous, densely yellowish-gray pruinulent, the dorsum with five interrupted dark brown vittae which resemble series of spots, one of these spots situated behind the prescutellar acrostichals and between them; scutellum mottled with brown. Each abdominal tergite with an elongated dark brown spot in middle forming an interrupted vitta, a large transverse spot of same colour on each side, almost connected with the median one, and a small spot on each lateral margin below, the ground colour ochreous. Legs ochreous, femora slightly browned, fore pair most distinctly so, each tibia with three brown annuli, a faint one at base, and two more distinct, one at middle and the other at apex. Wings hyaline. Halteres ochreous.

Eyes bare; anterior reclinate bristle nearly half as long as the proclinate orbital and midway between it and the posterior reclinate one; ocellars strong; postverticals weak. Prescutellar acrostichals distinct. Mid tibia slightly clubbed, and with about 4 erect hairs on the thickened apical part on anterior side, the longest one not as long as diameter of tibia. First posterior cell of wing nar-

rowed apically; outer crossvein at less than its own length from apex of fifth vein; penultimate section of fourth vein one-third as long as ultimate section.

Length, 2.5 mm.

Type, Eidsvold.

LEUCOPHENGIA Mik.

There are 45 recorded species of this genus: 19 of these are from Asia and the Orient, 11 from Africa and adjoining islands, 11 from the New World, 3 from Europe, and 1 from Queensland.

So far as is known the larvae feed in fungi.

Key to species.

1. A conspicuous black mark on each side of scutellum at base, the thorax yellow. 2.
Thorax, including the scutellum, unicolorous yellowish. 3.
2. Abdomen with three elongate black spots on each tergite including the first visible, the spots almost contiguous near hind margin, but not connected by a hind marginal band, the outer spot of the three on each tergite broadly connected with the one on the incurved part of same tergite. . . .

poeciliventris, n.sp.

Abdomen with two widely separated black spots on dorsum of first visible tergite, a broad posterior band of black on each of the other tergites which is noticeably extended forward in middle and less so at sides, and a spot on lateral incurved margin of each tergite except first visible, which is not connected with the marginal band. *scutellata*, n.sp.

3. First visible tergite with about 4 long strong bristles along hind margin on each side of median line, the margin of segment snow white, as is the entire next tergite, base of third broadly silvery; the dark markings on dorsum consist of a pair of large transverse blackish spots on tergites 1, 3, 4, and 5, which are narrowly separated except on 5th, ventral portions of tergites on basal half of abdomen snow white, on apical half black and glossy. *niveifasciata*, n.sp.

First visible tergite yellow, with a black spot on each side on dorsum, second glossy black with a yellow spot on each lateral angle anteriorly, tergites 3 and 4 each black with a yellow spot on each side of median line anteriorly, lateral ventral portions of tergites black on their posterior margins. . . .

polita, n.sp.

N.B.—A rather striking peculiarity of the four species is that in every case the halteres are yellow, with a black spot on the outer side of the knob. In the New World species the halteres are unicolorous yellow and only in two or three Javanese species described by de Meijere does this character occur again in the genus. One of the latter is very closely similar to *niveifasciata*, but I believe they are distinct, no mention of the very conspicuous bristles being made by de Meijere. I believe, however, that he has erroneously assigned another species from Java to this species, *albicineta*, and that the one described in 1914 is distinct from the one he had in 1908.

One species described as a *Drosophila* from Australia by Bergroth is evidently a *Leucophengia*, but it is distinct from any before me. I give a copy of his description to facilitate its identification.

DROSOPHILA BELLULA Bergroth.

"Fulva, dorso abdominis macula laterali segmenti primi, macula media subapicali segmenti secundi, maculi laterali et media subapicali segmenti tertii et quarti (laterali segmenti quarti interdum deficiente), saepe etiam puncto media

segmenti quinti nigris ornato, ventre macula laterali segmenti tertii, quarti quintique nigris notato. Palpi longi et lati, compressi, apicem epistomatis sat longe superantes. Alae subhyalinae, ad apicem venae cubitalis brevissime apiculatae, costa solum ad apicem vena cubitalis pertracta, vena subcostali brevi, ante venam transversam anticam desinente, vena radiali apicem versus recta, longa ultra medium alae producta, vena cubitali apice a vena radiali quam a vena discoidali circiter duplo longius remota, segmento ultimo venae discoidalis penultimo paullo plus quam duplo longiore, vena transversa postica a vena transversa antica quam ab apice venae posticalis paulum longius distante. Pedes pallide testacei. Long. 2-2.5 mm." Queensland.

LEUCOPHENGHA POECILIVENTRIS, n.sp.

♀.—Head tawny yellow, ocellar spot fuscous, third antennal segment slightly brownish; upper half of occiput, except margin, black. Dorsum of thorax shining fulvous, pleura paler and thinly silvery pruinose; scutellum fulvous, paler along apical margin, and with a large black spot on each side at base. Abdomen as described in key. Legs stramineous, knees of mid and hind pairs a little darkened. Wings immaculate, all veins distinct. Halteres yellow, with a black spot on outside of knobs.

Frons one-fourth of the head width; palpi slightly broadened; eyes bare; rays of arista 7:3. Prescutellar pair of acrostichals minute, not clearly differentiated. Bristles on hind margins of second and third visible tergites of moderate and regular lengths, rather widely and evenly spaced. Legs normal. Wing slightly pointed, third vein ending in tip; first posterior cell not narrowed apically; last section of fourth vein as distinct as others, about 2.25 times as long as preceding section; outer crossvein nearly erect and at about its own length from apex of fifth vein.

Length, 3 mm.

Type, Blue Mts., January 26, 1922.

LEUCOPHENGHA SCUTELLATA, n.sp.

♀.—Differs from the preceding in being less shining, in having the apex of scutellum more noticeably yellowish-white, the black lateral spots on same smaller, and the abdomen marked as stated in key.

The head and thorax are as in last species, but the pair of prescutellar acrostichals are large and conspicuous. The mid tibiae in both species have the usual series of microscopic hairs on the posterodorsal surface. The wing is less pointed than in *poeciliventris*, the fourth vein has a very faint forward curvature at apex, and the penultimate section of fourth vein is half as long as ultimate.

Length, 3 mm.

Type, Sydney. One paratype, bred from fungus, Sydney, May, 1915.

LEUCOPHENGHA NIVEIFASCIATA, n.sp.

♂. ♀.—Head and thorax as in preceding species, but there are no black marks on the scutellum. The very conspicuous silvery white mark on abdomen which covers apex of first visible tergite, all of second, and the basal half of third tergites is the most characteristic feature of this species. In addition to this mark there are paired black spots as stated in the key, but the female has these less distinct basally and the apical two or three tergites are mostly blackish brown. Structurally as the preceding species, but the long bristles on first visible tergite, which are less conspicuous in the female, readily distinguish it from the others.

Prescutellar acrostichal bristles distinct. Wings as in *scutellata*. Palpi slender, with some fine black hairs.

Length, 3-3.5 mm.

Type, male, and 1 ♂ paratype, Woolgoolga, N.S.W., January 27, 1923. Allotype, Eidsvold, December, 1922. Paratype, ♂, Sydney, February 12, 1921.

LEUCOPHENGIA POLITA, n.sp.

♀.—Shining fulvous, the abdomen with black markings as noted in the key. As in the last species the legs are entirely stramineous.

Palpi as in last species; frons nearly one-third of the head width. Wing as in *scutellata*.

Length, 3 mm.

Type, Woolgoolga, N.S.W., January 27, 1923.

DROSOPHILA Fallen.

This genus is the most generally distributed and the largest in point of number of species in the family. It is amongst the species of the *melanogaster* group that the species are found which have yielded such interesting results in laboratory work on evolution and heredity, etc. Most of them live but a short time in any stage, but they occur indoors at all times of the year. The larvae closely resemble those of the Ephydridae, having two breathing tubes of variable length at the anal end; in the pupal stage, however, these tubes are retracted and sometimes the prothoracic pair are very much elongated. This reversal is due to the fact that in the larval stage the head is kept under the surface of the pabulum in feeding and the connection with the air is maintained by means of the anal tubes, while in the pupal stage the connection with the air is maintained by means of the anterior tubes which are correspondingly lengthened.

The key given here is not intended to give an idea of the number of species in Australia, which must be large, but to include only those which I have seen.

Key to species.

1. Fore femur in both sexes with a comb-like series of minute black spinules on apical half of anteroventral surface; species almost entirely yellow; thorax with 8 or more series of minute setulae between dorsocentrals.
immigrans Sturtevant.
- Fore femur without such a series of spinules in either sex. 2.
2. Thoracic dorsum with minute dark brown dots at bases of all the bristles and hairs, some of them aggregated on certain areas into larger spots. . . . 3.
- Thoracic dorsum with 4 conspicuous broad dark brown vittae, the outer one on each side interrupted at suture, the submedian pair fused in front of scutellum; disc of scutellum of the same colour as vittae, the anterior lateral angles gray pruinulent. *lativittata*, n.sp.
- Thoracic dorsum with 5 or 7 very slender dark brown vittae, pleura with two or three similar but broader vittae; disc of scutellum not much darker than basal lateral angles; third antennal segment fuscous, conspicuously darker than second. *buscki* Coquillett.
- Thoracic dorsum entirely without either distinct dots or vittae. 5.
3. Facial carina practically absent except between bases of antennae where it is sharp and linear; eyes bare. *obsoleta*, n.sp.
- Facial carina conspicuous below where it is rather broad and vertically sulcate; eyes with stiff erect microscopic hairs. 4.
4. At least the first three tergites with a yellowish spot on the part that is incurved on venter. *repleta* Wollaston.

- None of the tergites with a yellowish spot as above. . . . *hydei* Sturtevant.
5. Facial carina obsolete below, distinct and linear on upper part of face between bases of antennae; wings hyaline, outer crossvein slightly clouded; penultimate section of fourth vein half as long as ultimate. . . . *inornata*, n.sp.
- Facial carina conspicuous and broad on lower half of face. 6.
6. Large species, at least 3 mm. in length; wings evenly brownish, the outer crossvein narrowly but very noticeably clouded, easily seen with the unaided eye; last section of fourth vein 1.75 times as long as preceding section. *brunneipennis*, n.sp.
- Smaller species, averaging under 2 mm. in length; wings hyaline, outer crossvein not clouded; basal segment of fore tarsi in male with a comb of stiff contiguous bristles at apex on anterior side; last section of fourth vein over twice as long as preceding section. *melanogaster* Meigen.
- N.B.—I include the description of *balteata* Bergroth, but suspect that it is a synonym of *melanogaster*. This cannot be decided without an examination of the type.

DROSOPHILA OBSOLETA, n.sp.

♀.—Head ochreous, brown on ocellar region, at base of anterior orbital bristle, and less so at bases of the other frontal bristles; third antennal segment blackish; palpi fuscous. Thorax fuscous, densely yellowish-gray pruinose, a minute brown dot at base of each bristle and hair on disc of mesonotum; humeri and scutellum yellowish, the latter darker on disc. Abdomen shining dark brown, hind margins of tergites yellowish. Legs, including coxae, dirty straw-coloured, with a very slight indication of a darker annulus at base of each tibia. Wings clear, crossveins almost unclouded. Halteres yellow.

Lower reclinate bristle small, close to base of proclinate; postvertical pair rather large; eyes without hairs; vibrissae well differentiated. Thorax with 6 series of setulae between the dorsocentrals; sternopleurals 1:2. Legs normal. Sixth wing-vein subobsolete; penultimate section of fourth vein half as long as ultimate; outer crossvein at about its own length from apex of fifth.

Length, 1.75 mm.

Type, Sydney, March 7, 1921. Paratype, Glenreagh, N.S.W., January 29, 1923.

DROSOPHILA REPLETA Wollaston.

A larger species than the preceding, averaging about 3 mm. in length, and more robust. Usually there is a darkening of the apex of first wing-vein present which in some cases is quite conspicuous.

There are three closely allied species recorded from North America, only two of which I have seen from Australia. Though the adults of these species are very similar, according to Sturtevant the immature stages are abundantly distinct.

Loc.—Sydney, Blue Mts., Lord Howe Island, and South Australia. Some of the specimens were taken in houses. The species is very common in lavatories in America.

DROSOPHILA HYDEI Sturtevant.

Distinguishable in the adult stage when pinned only as indicated in the key.

Three specimens from Sydney.

DROSOPHILA BUSCKI Coquillett.

Another very widely distributed species which may be distinguished from its allies by the very narrow dorsal thoracic and broader pleural vittae.

Synonyms of this species are *rubrostriata* Becker and *plurilineata* Villeneuve. Recorded from North America, Western Australia, Canary Islands, Europe, and Africa.

Length, 2 mm.

One specimen, Sydney, January 8, 1921.

DROSOPHILA MELANOGASTER Meigen.

Commonly listed as *ampelophila* Loew and known popularly as the Vinegar Fly.

There are one or two other species which have a comb at apex of basal segment of fore tarsus in the male, but none of these have been found amongst the material from Australia.

Loc.—Sydney, and South Australia.

DROSOPHILA IMMIGRANS Sturtevant.

Easily distinguished from its allies as stated in the key. The presence of a closely set series of minute black setulae on the apical third or more of the antero-ventral surface of the fore femur is characteristic of many species of the family Lauxaniidae (Sapromyzidae) but the present species is a true *Drosophila*.

I have seen *immigrans* from Sydney and it occurs in Western Australia, North and South America, Europe, and the Hawaiian Islands.

DROSOPHILA INORNATA, n.sp.

♀.—Ochreous yellow, slightly shining. Occiput and ocellar region infuscated, orbits gray pruinose, antennae and palpi ochreous. Dorsum of thorax slightly grayish pruinose and with very faintly indicated grayish vittae; postnotum brown, grayish pruinose. Abdominal tergites each with a dark area on each side which become larger posteriorly, the apical two tergites almost entirely brown or fuscous. Wings clear, outer crossvein slightly clouded. Halteres yellow.

Eyes sparsely haired; lower reclinate orbital bristle not half as long as proclinate one and close to base of latter; postvertical bristles long. Thorax with 8 intradorsocentral series of setulae; prescutellar acrostichals distinct; sternopleurals 1:2, the upper posterior one large. Legs normal. Section of costa before apex of second vein four times as long as the one beyond it; outer crossvein at about its own length from apex of fifth vein.

Length, 2.5 mm.

Type, Blue Mts., January 15, 1922. Paratypes, two poorly preserved specimens, Sydney.

DROSOPHILA BRUNNEIPENNIS, n.sp.

♀.—Dark fulvous, slightly shining. Head without distinct markings. Thoracic dorsum with faint indications of four darker fulvous vittae. Posterior third of each abdominal tergite fuscous. Legs fulvous yellow. Wings evenly browned, outer crossvein rather noticeably clouded with dark brown.

Eyes sparsely haired; frons a little over one-third of the head width; lower reclinate orbital bristle much less than half as long as proclinate one and a little closer to base of latter than to the upper reclinate one; rays of arista 4:2; facial carina almost equally wide on its lower two-thirds, flattened but not sulcate; vibrissae short and weak; palpi broadened. Eight series of intradorsocentral setulae; both the posterior sternopleural bristles long and strong; thoracic dorsum damaged by the pin so that it is impossible to say if the prescutellar acrostichals

are present. Legs normal. Outer crossvein at about its own length from apex of fifth vein; section of costa before apex of second vein three times as long as the one beyond it.

Length, 3.5 mm.

Type, Sydney, September 24, 1922.

DROSOPHILA LATIVITTATA, n.sp.

♂. ♀.—Head fulvous, grayish on orbits, conspicuously so at bases of bristles, face whitish on sides; third antennal segment brownish above; palpi yellow; occiput blackened except on margins. Thoracic dorsum with 4 broad chocolate-brown vittae and the lateral margins of same colour, the narrow more or less broken interspaces gray pruinose; pleura dark brown, with some small gray areas. Each abdominal tergite with a broad transverse chocolate-brown mark on each side of median line on hind margin, which is dilated at inner and outer extremities on dorsum and more or less connected with a spot on lateral margins below, apical tergite in male yellow, in female dark brown. Legs tawny. Wings clear. Halteres yellow.

Eyes with dense stiff erect hairs; orbital bristles as in *brunneipennis*; facial carina with a short round flattened area below; vibrissae distinct. Thorax as in *brunneipennis*, the prescutellar pair of acrostichals distinct, the upper posterior sternopleural bristle long and strong. Section of costa before apex of second vein about 3 times as long as the one beyond it; outer crossvein at its own length from apex of fifth vein; last section of fourth vein about twice as long as preceding section.

Length, 2-2.5 mm.

Type, female, and allotype, Sydney. One ♀ paratype, Sydney, Aug. 28, 1921.

DROSOPHILA BALTEATA Bergroth.

"Testaces, limbo postico segmentorum dorsaliu abdominis nigro, segmentis tribus ultimis interdum totis nigris, quinto raro flavido. Alae subhyalinae, costa usque ad apicem venae discoidalis pertracta, vena subcostali brevi, ante venam transversam anticam desinente, vena radiali subrecta, sat longe ultra medium alae producta, vena cubitali apice a vena radiali quam a vena discoidali plus quam duplo longiore, vena transversa postica a vena transversa antica et ab apice venae posticalis subaeque longe remota. Pedes testacei. Long. 1.8-2 mm." Queensland.

SCAPTOMYZA Hardy.

All the species of this genus are distinguished from those of *Drosophila* by their more slender form and the presence of either two or four series of intra-dorsocentral setulae on the thorax. Otherwise the genera are very similar. The larvae sometimes mine in the leaves of cultivated vegetables.

Only one species from Australia is known to me. It rather closely resembles one described under the name *substrigata* by de Meijere from Java.

SCAPTOMYZA AUSTRALIS, n.sp.

♂. ♀.—Head testaceous yellow, upper half of occiput black, ocellar triangle, vertex in centre, and orbits, whitish-gray pruinose; antennae and palpi yellow. Thorax black to yellow, in well preserved specimens densely gray pruinose and opaque, when rubbed showing glossy under the dusting. Abdomen brownish or yellowish basally, dark brown or black apically, with much less conspicuous dust-

ing than thorax. Legs including the coxae tawny yellow. Wings clear. Halteres yellow.

Eyes densely haired; facial carina complete; rays of arista 5:2. Thorax with 1 humeral, two series of intradorsocentral setulae, and sternopleurals 1:1. Abdomen and legs normal. Section of costa before apex of second vein about three times as long as the one beyond it; third vein with a very slight downward bend at apex so that the cell behind it is slightly narrowed at apex, the vein ending in wing tip; last section of fourth vein about 1.5 times as long as penultimate section; outer crossvein at a little over its own length from apex of fifth vein.

Length, 2-2.5 mm.

Type, female, and allotype, Sydney, the form with yellowish thorax. Paratypes, two from Sydney, also the yellow form, Nov. 12 and Dec. 6, 1920. Paratypes, mostly of the blackish form, Illawarra, N.S.W. (H. Petersen). This last lot sent me by Dr. C. F. Baker of the College of Agriculture, Philippine Islands.

Family CHLOROPIDAE.

I have very little material in this family from Australia at present, but take the opportunity afforded in this paper to mention the existence of a new character for the recognition of the family and to redefine one of Becker's genera.

The character referred to above consists of a distinct flexure of the fifth vein directly below the inner crossvein. This peculiarity is emphasised in many cases by a slight elevation of the field of the discal cell which runs obliquely backward and upward to the fourth vein in front of the inner crossvein, and at this point the fourth vein is usually slightly weakened.

I have found this character of great value in determining the family relations of doubtful species such as belong to *Parahippelates*, and in only a very few cases of species which, in other respects, were without doubt true chloropids, have I found this flexure almost indistinguishable. No other family has this character, so far as I can discover, except some aberrant Ephydriidae.

PARAHIPPELATES Becker.

This genus has been found only in New Guinea and Australia. It differs from nearly all other Chloropidae in having the orbits and interfrontalia with rather strong setulae, in possessing a pair of distinct cruciate postvertical bristles, moderately strong dorsocentral thoracic bristles, one incurved and one outcurved humeral bristle, at least one sternopleural, and two or more discal setulae on the scutellum besides the long marginal bristles. The curved bristle at apex on outer, or anterior, side of hind tibia, which it possesses in common with *Hippelates*, is sometimes very short. The genus belongs to the subfamily Osciniinae, the costa being continued to apex of fourth vein and the hind tibiae having a flattened sensory area at middle on dorsum.

Nothing is known of the habits of the species, but in the adult stage *Hippelates* is very annoying to persons in North America by buzzing round the face in summer and getting into the eyes and nostrils, evidently attracted, like *Phortica* species, by the perspiration.

I have before me three species, none of which agrees with the description of *nudiseta* Becker, the only Australian species so far known.

Key to species.

1. Wing with a large black patch in middle covering about one-third of its area; arista practically nude, not twice as long as third antennal segment; femora largely black. *ornatipennis*, n.sp.

- Wings not so marked, either hyaline or faintly marked along the costa with pale brown; femora yellow. 3.
3. Dorsum of thorax fulvous yellow, very distinctly shining, with very faint pruinescence; third antennal segment largely brown; arista with its longest hairs about as long as its basal diameter; costa of wing rather noticeably browned from apex of first vein to apex of fourth.
brunneicosta, n.sp.
- Dorsum of thorax gray-brown, but little shining, gray pruinose; wings not marked as above. 4.
4. Arista densely short-haired, the longest hairs fully as long as its basal diameter.
duplicata, n.sp.
- Arista almost bare.
nudiseta Becker.

PARAHIPPELATES ORNATIPENNIS, n.sp.

♀.—Frons black above, yellowish in front, with dense pale gray pruinescence, yellow on anterior third and in front of ocelli; face yellow; occiput black; cheeks densely white pruinose; antennae rufous yellow, with some white pruinescence; arista yellow, brown at base; palpi yellow. Dorsum of thorax shining chocolate-brown, with a broad yellowish-gray vitta between anterior dorsocentrals, which extends but little beyond the suture; scutellum coloured as mesonotum, with a large gray pruinose spot on each anterior lateral angle; pleura silvery gray pruinose, except on extreme upper margin. Abdomen coloured as mesonotum, all of first visible tergite and the sides of the others silvery pruinose. Legs fulvous, coxae, femora except apices, a median band on hind tibiae, and the apical two tarsal segments black. Wing veins yellow on basal half, fuscous beyond, a broad blackish band fills all the disc from a little beyond apex of first vein to apex of second, over the wing as far as fifth vein and to slightly beyond outer crossvein. Knob of halteres whitish.

Ocellar triangle indistinct; one pair of very noticeable interfrontal bristles; cheek about three-fourths of the eye height, the latter longer than high; vibrissal angle not much produced, the vibrissae small and weak, simple; antennae small. Thoracic dorsocentrals 1 + 3; anterior acrostichals indistinct. Legs more slender than usual; tibial spur very small and weak. Outer crossvein at not over its own length from apex of fifth vein and fully twice as far from inner crossvein.

Length, 3.5 mm.

Type, Chelsea, Victoria, Sept. 28, 1919 (F. E. Wilson).

PARAHIPPELATES BRUNNEICOSTA, n.sp.

♀.—Head fulvous yellow, cheeks and face paler, with a whitish bloom; third antennal segment fuscous, yellow at base; palpi yellow; proboscis yellow, brown at apex. Thorax fulvous, almost glossy, with very faint yellowish-gray pruinescence. Abdomen concolorous with thorax, but crushed in type so that no markings show. Legs fulvous, apices of tarsi slightly darkened. Wings hyaline, with a faint brown shade along costal half from apex of first vein to apex of fourth. Halteres yellow.

Eyes subnude; frons half of the head width; triangle extending to beyond middle of frons; interfrontalia with black setulae, the median series long; third antennal segment not longer than wide; arista pubescent, about three times as long as third antennal segment; vibrissal angle distinctly produced, one moderately long and one short bristle present; cheek a little less than half of the eye height, the eye higher than long. Thorax with 1 + 3 dorsocentrals, acrostichals well developed, divergent posteriorly; scutellum flattened on disc. Spur of hind

tibia about as long as tibial diameter, strong. Section of costa before apex of second vein fully 1.5 times as long as the section beyond it; veins 3 and 4 parallel, last section of 4 about 1.75 times as long as preceding section; outer crossvein at about 1.25 its own length from apex of fifth, the latter not reaching margin of wing.

Length, 4 mm.

Type, Darwin, Queensland (G. F. Hill).

PARAHIPPELATES DUPLICATA, n.sp.

♂.—Head testaceous yellow, with yellowish pruinescence; a large spot on each side of upper half of occiput, ocellar spot, arista, and apex of proboscis fuscous, frontal triangle more densely pruinescent than remainder of frons. Thorax broadly fuscous on middle of dorsum, margins of mesonotum and pleura rufous yellow, lower half of sternopleura black. Dorsum of abdomen coloured as disc of mesonotum, hind margins of tergites and the venter rufous yellow; hypopygium shining black. Legs tawny, the apices of tarsi hardly darker. Wings grayish hyaline, veins brown. Halteres pale brown.

Frons at vertex well over half as wide as head, narrowed anteriorly; interfrontalia with rather strong setulae; antennae small, third segment rounded, not longer than broad; arista with dense black hairs, the longest of which are fully as long as its basal diameter; eye elongate oval, longer than high; face almost vertical; cheek nearly two-thirds as high as eye, vibrissal angle with two short equal black bristles. Thorax as in preceding species. The glossy black hypopygium conspicuous, almost knob-like. Spur on hind tibia distinct but not prominent. Section of costa before apex of second vein about 1.25 times as long as the section beyond it; veins 3 and 4 subparallel; outer crossvein at fully twice its own length from apex of fifth, the last section of fifth about equal to penultimate section of fourth, the latter barely half as long as ultimate section of fourth.

Length, 2.75 mm.

Type, Melville Is., N.T. (G. F. Hill).

PARAHIPPELATES NUDISETA Becker.

“Thorax und schildschen graubraun, kaum etwas glanzend; Aerostikalborsten in zwei Reihen divergierend; die Reihe der Dorsocentralborsten mit je vier längeren Borsten. Schildschen und sternopleuren dem Gattungscharakter gemäss behaart oder beborstet; Brustseiten im übrigen ganz mattgrau.—Kopf gelb; Augen klein rund und nackt; Stirn hinten doppelt so breit wie ein Auge mit einem ziemlich breiten, aber nur bis zur Stirnmitte reichenden rostgelben, etwas graubraun bestäubten Scheiteldreieck. Stirnfläche spärlich schwarz behaart, an den Augenrandern ungefähr je drei Orbitalborsten. Fühler rothgelb; drittes Glied fast rund klein, an der Spitze gebraunt mit einer längern fast nackten Borste. Mundborste vorhanden. Backen gelb, so breit wie 2/3 des vertikalen Augendurchmessers; Taster gelb; Russel rostbraun, glanzend mit etwas geknieten schmalen Saugflächen. Hinterleib gelbgrau mit undeutlichen braunen Vorderranbinden, deutlich und am Hypopygium ziemlich lang schwarz behaart. Schwinger weisslich. Beine rothgelb, Tarsenglieder kaum etwas verdunkelt; Hinterschienen mit deutlichem krummen schwarzen Dorn. Flügel deutlich etwas braun mit ganz derselben Aderung wie bei der vorigen Art. Länge des Körpers 3-3 1/2 mm.”

Sydney, Botany Bay.

Family AGROMYZIDAE.

AGROMYZA ARTEMISIAE Kaltenbach.

One female of this European species is before me from Botany Bay, N.S.W. (H. Petersen). It was submitted for identification by Dr. C. F. Baker of the Philippine Agricultural College.

Colour deep black, shining, the frons, face, and lateral margins of mesonotum lemon yellow. Legs entirely black. Knobs of halteres yellow. Outer crossvein very little beyond apex of first vein; last section of fifth vein twice as long as preceding section. Thorax with two pairs of dorsocentral bristles.

Length, 1.75-2.5 mm.

The species has been found commonly in North America, where it has been known under the following names: *platyptera* Thomson, *coronata* Loew, *jucunda* v.d. Wulp, *malvae* Burgess, and *lateralis* Williston. It has been reared from larvae mining in goldenrod (*Solidago*), sunflower (*Helianthus*), aster, *Verbena*, and *Artemisia*.

PHYTOMYZA ATRICORNIS Meigen.

One female submitted along with the above and from the same locality.

Evidently a cosmopolitan species, as it occurs in Europe, North America, Canary Islands, Formosa, and Australia, so far as known at present.

Black, opaque gray pruinulent, without vittae on thorax. Head black, frons and face yellow, antennae and palpi black, the latter not dilated and the arista normal. Thorax with four pairs of dorsocentral bristles and no seriate acrostichals. Scutellum gray. Abdomen without conspicuous yellow markings. Legs including fore coxae black, apices of femora yellow. Wings hyaline, first section about 1.3 as long as the next two combined, second less than half as long as third.

Length, 1.5-2 mm.

The larvae feed in many plants including the genera *Chrysanthemum*, *Helianthus*, *Erigeron*, *Senecio*, *Sonchus*, *Taraxacum*, *Lactuca*, *Centaurea*, *Scabiosa*, *Knautia*, *Isatis*, *Ononis*, *Phaseolus*, *Pisum*, *Brassica*, *Sinapis*, *Cheiranthus*, *Lepidium*, *Galeopsis*, *Linaria*, *Phlox*, and *Papaver*.